Abstract Text - ABTX (1):

A local area contrast enhancement scheme for a video display includes a two dimensional recursive filter to obtain a moving average of the intensity variations in all areas of the display. This moving average is subtracted from the original signal to produce a signal which contains only local variations and this latter signal is expanded to increase the display contrast. The local area contrast enhancement scheme allows low contrast details to be perceived and permits hands-off operation of the display under varying scene conditions. The recursive filter approach results in a simple implementation of the enhancement scheme with both analog and digital circuitry.

Detailed Description Text - DETX (13):

An alternate way of obtaining a running (or moving) average is known in the prior art as a recursive filter. A recursive filter obtains a running average without explicitly averaging the large number of intensities in a given window. For example, with a large series of numbers, the running average over 10 points, for example, can be at least closely approximated by taking 9/10 of the previous average and adding 1/10 of the next number in the series so as to obtain a first result. Thereafter, taking 9/10 of the first result and adding it to 1/10 of the next number in the series will obtain a second result. Subsequently taking 9/10 of the second result, adding it to 1/10 of the next

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8			US 4231065 A	19801028	Local are
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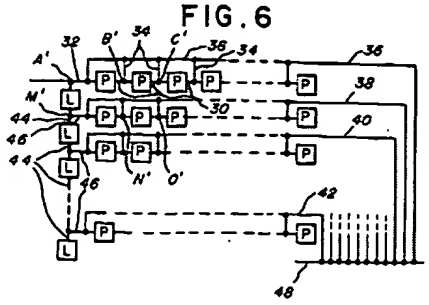
FIG. 6



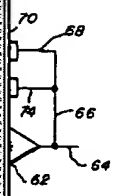


FIG. 8

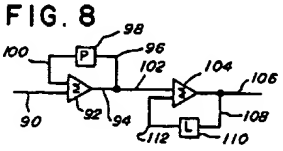
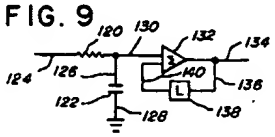


FIG. 9



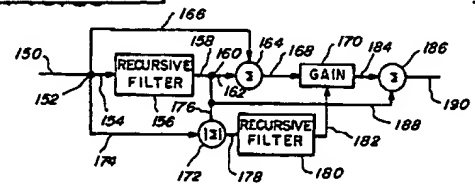
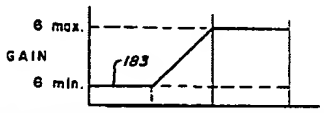


FIG. 11



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Detailed Description Text - DETX (17):

FIG. 4 is a block diagram of noise reducer 301 which, as shown, is comprised of difference circuits 501 and 503, a frame memory 502, and a non-linear circuit 504. Noise reducer 301 (i.e., time filter 301) is a recursive filter which employs a single frame memory in order to average the amount of noise in the moving picture signal. The video signal supplied to noise reducer 301 is supplied at input terminal 500 and then to both difference circuits 501 and 503. The output of difference circuit 501 is supplied to frame memory 502 which stores a frame therein and operates as a frame delay, and outputs a previously stored frame at the same time a current frame is supplied to difference circuit 503. Frame memory 502 supplies the previous frame stored therein to difference circuit 503 which detects differences between the currently supplied frame (from terminal 500) and a previously supplied frame (from memory 502) to produce a difference signal .DELTA.F which represents differences therebetween and supplies difference signal .DELTA.F to nonlinear circuit 504. Nonlinear circuit 504 has a nonlinear characteristic, as shown in FIG. 5, and which supplies an output .DELTA.F' which is a function of .DELTA.F and the of value of the controllable variable K.sub.m. As shown in FIG. 5, the greater the value of K.sub.m, the greater the amount of noise that is removed from the video signal, wherein no noise is removed when K.sub.m equals 0.

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s Patent [19]

[11] Patent Number: 5,875,003

[45] Date of Patent: Feb. 23, 1999

METHOD FOR
GITAL VIDEO SIGNAL

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1997

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ation Priority Data

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HO4N 9/64

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348/411, 416,
701, 699, 384, 390, 400, 402,
415, 409, 420, 396; 382/236,
239; HO4N 7/36, 5/14, 9/64

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[57] ABSTRACT

Apparatus and corresponding method which motion compensate encode a digital video signal pre-filtered in a first filter but use motion information derived from the same video signal pre-filtered in a second filter to encode the first-filtered video signal. A received digital video signal is filtered in a first pre-filter which has a controllable filter characteristic that varies in response to several characteristics of the received digital video signal. The originally received digital video signal also is filtered in a second pre-filter. A motion vector is derived from motion that is detected in the second filtered signal, and the first filtered video signal is motion compensated encoded using the derived motion vector of the second filtered video signal.

34 Claims, 23 Drawing Sheets